**BACKGROUND**

This Standard Operating Procedure (SOP) provides detailed descriptions of procedures to be followed unless alternate procedures have been outlined in an IACUC Protocol Application. If an investigator wishes to deviate from the approved SOP, all changes must be outlined and justified in the protocol application (approval of the protocol indicates approval of the deviation from the SOP for that project only).

It is the researcher’s responsibility to ensure that adequate post-operative/post-anesthetic care is provided. The individual(s) providing post-operative care must be familiar with the approved IACUC Protocol, have the skills and abilities to perform the assessments as indicated below, and must be able to provide support in case of complications. A qualified Laboratory Animal Technician may be hired at an hourly rate to perform these tasks. It is important to note that these guidelines are MINIMUM STANDARDS.

The aim of this SOP is to:
- provide for a rapid, smooth and pain free recovery
- reduce the chances of complications frequently associated with anesthesia
- identify and correct as quickly as possible, any complications that occur

**IACUC Procedure**

<table>
<thead>
<tr>
<th>Pre-anesthetic Examination</th>
<th>All animals must be evaluated immediately prior to anesthesia to assure that they are healthy and capable of tolerating a general anesthetic event. Animals that are showing signs of disease should be evaluated by a veterinary staff member prior to administration of anesthesia. Animals that are hunched and scruffy, have reduced activity, or any changes in respiratory status (increased rate or effort) are particularly susceptible to anesthetic complications.</th>
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<tbody>
<tr>
<td>Anesthetic Selection</td>
<td>If inhalant anesthetics (isoflurane) are used, it should be administered in oxygen via a precision vaporizer. In certain instances a drop jar method of anesthesia may be appropriate. It should only be used for non-surgical procedures requiring short anesthetic episodes. Specific requirements regarding the safe use of gas anesthetics can be found in the IACUC SOP, <a href="#">Vaporize Equipment Monitoring and Maintenance</a>. If pentobarbital is used for a survival anesthetic event, please review the Use of Non-Pharmaceutical Grade Drugs policy. This policy contains important information about the use of compounded pentobarbital as well as the use of euthanasia solution (such as Fatal Plus) for terminal perfusion.</td>
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<tr>
<td>Supportive Care</td>
<td>All anesthetized animals must receive heat support to prevent the development of hypothermia, one of the most common causes of anesthetic complications in rodents. Circulating hot water blankets and rodent specific electric heating pads are the preferred methods of heat support. Re-warmable heating pads (SnuggleSafe pads) can be used but require regular assessment and reheating and electric pads that are not intended for veterinary use can result in inadvertent burns. Eye lubricant must be applied to both eyes to prevent drying of the corneas and</td>
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subsequent ocular inflammation. The lubricant should be re-applied every 30-60 minutes until recovery.

For surgical procedures longer than 30 minutes and/or where fluid loss due to hemorrhage or evaporation is anticipated, fluid support should be provided. Warmed subcutaneous or intravenous fluids (Lactated Ringer’s or normal saline) are given at the rate of 10-15 ml/kg.

### Anesthetic Monitoring

During anesthesia, animals may never be left unattended and should be monitored throughout the procedure to ensure that anesthetic depth is adequate to the procedure being performed.

General indicators of adequate anesthetic depth include regular respirations, lack of response to toe or tail pinch, and lack of palpebral (eyelid) or whisker reflexes. Excessive anesthetic depth will most often manifest as a slowing respiratory rate that progresses to irregular, deep breaths that may produce a convulsive movement of the body.

### Initial Recovery

*This period extends from the cessation of anesthetic delivery until an animal is up and moving normally about the cage.*

The animal is placed in a clean dry cage without bedding, as it may be ingested or inhaled during recovery. Alternatively the animal may be returned to its home cage if placed on a paper towel to avoid direct contact with the bedding. To prevent possible injury to the anesthetized animal, recovering animals should be singly housed. If recovering animals are group housed, continuous monitoring must be done.

Supplemental heating must be continued through the immediate recovery period. If the animal is in direct contact with the pad, electric heating pads are discouraged because they can cause thermal burns – water-circulating heating pads are preferred.

Recovery progress should be evaluated through one or more of the following methods: rate and depth of respiration color of mucous membranes, ears and/or tail and reflexes (i.e. pedal, palpebral, whisker).

Animals should be assessed and turned every 10 minutes to improve respirations and decrease recovery time.

The procedure performed must be noted on the animal’s cage card.

Once the animal has regained normal ambulation the animal must be returned to normal housing in the DLAR vivarium, unless otherwise described in the protocol. Additional supportive care will be provided by the research team unless DLAR staff is directed to assume this responsibility.

*Additional monitoring/recordkeeping may be necessary for those animals that undergo any invasive survival procedures such as surgery or injury. These requirements are outline in the Principles of Rodent Surgery policy.*

### SUMMARY

The PI acknowledges that the above procedure represents minimum standards only. Animals experiencing complications will be afforded more frequent monitoring and care, and a veterinarian will be consulted for further guidance.